THE 21ST CENTURY STATE DOT

Message

- **Significant Opportunities** for improving future highway service will be derived from maximizing the service from the existing *(*constructed) network.

- Achieving this will require **substantial changes** in state DOT mission, practice and organization.

THE NEW NORMAL

A mature network and congested facilities
vs.
Just-in-time society

- "Normal" conditions are no longer average
  - Longer peaks
  - Increased Incidents
- Yet customers placing higher value on:
  - Improved reliability
  - Minimal delays, disruption
- Constraints to conventional improvement
  - Resource constraints ($, ROW)
  - Long time frames (10 +)

NEW UNDERSTANDING OF "PERFORMANCE" ……..

- Half of delay (and most of unreliability) is due to "non-recurring congestion" – not capacity shortfalls
  - Breakdowns and crashes
  - Construction workzones
  - Weather
  - Poor signal timing

} *Urban and rural*

Much of this capacity can be recaptured through aggressive systems management

..... AND CAUSES OF LOSS OF PERFORMANCE

Type of Cause	Contribution to total delay	Cause of Delay	Basic Mitigation Strategy
Recurring Causes	35-45%	Infrastructure (roadway & transit) capacity shortfalls	Capacity Increases
		Interchange bottlenecks	
		Weave & merge friction	Systems Management
		Poor signal timing	
Non-Recurring Causes	55-65%	Breakdowns & Crashes	
		Construction work	
		Weather	
		Vehicle mix	
		Special events	

CURRENT OPERATIONS REALITY

Mobility/Safety will increasingly be a function of:

- Improving efficiency (operational friction/throughput)
- Maintaining capacity in face of changing conditions (weather, demand)
- Responding to disruptions (crashes, breakdowns)
- Minimizing planned disruptions
- Integrating Vehicle and Infrastructure Operations

SUGGESTS A MAJOR NEW STATE DOT MISSION

"Operations and Management":

- *Active management of the existing transportation system to maintain customer-focused performance in the face of congestion, incidents and other service disruptions*

BEST PRACTICE INDICATE BENEFITS

EXAMPLE STRATEGY	BENEFITS
Freeway Management	Ramp metering in Minneapolis: 22% decrease in mainline travel times (ramp metering = one new freeway lane/direction
Arterial Operations	Adaptive signal controls/Canadian cities: delay decreases from 15-40% (typical C/B = 10-20:1)
Incident Management	Aggressive Incident management such as Seattle, DC, San Antonio: reduced clearance times of 20-50%; reduced secondary accidents by 30%
Work Zone Traffic Management	Extensive automation in Big I/Albuquerque: reduced average clearance times by 44% and reduced safety incidents by equal amount
Traveler Information	Simulations show reductions in travel time of 1-3 percent and substantial increases in perceived reliability
RWIS	Pre-event anti-icing program Idaho reduced accident frequencies by 83%

PROGRESS =

TECHNICAL CONCEPTS

+

NEW INSTITUTIONAL ARRANGMENTS

Source of Delay	Operations & Management Focus	Institutional Issues (beyond "systems")
Regional bottlenecks	•Next gen. freeway management (lane/speed/ramp controls)	•Local acceptance, cooperation
Inadequate signal timing	•Systematic deployment of traffic responsive tech	•Interjurisdictional consistency and sharing
Breakdowns and crashes	•Full detection and surveillance •Ramp, speed, lane control	•24X7 response •Formal IM programs •Aggressive comms to drivers
Construction work	•ITS and traffic-responsive features (ITS)	•Upgrade standards beyond MUTCD
Weather	•RWIS and driver info	•Prediction/advisory/control regimes
Vehicle mix (CVO)	•Special routing (guidance info)	•Liaisons with intermodal players
Special events (tourism)	•Special operational regimes	•Liaison with tourism community (regional)

POTENTIAL IMPACT OF SYSTEMS OPERATIONS

- Beyond current low implementation -- to intense system-wide applications of ITS and Operations strategies
- Impact equal to 7-10 years of new current-rate of new capacity (TTI), but targeted on most frustrating delay components
- Fraction of cost, minimal disruption

Why not?

NATIONAL PROGRESS

- Bellwether states
- AASHTO Subcommittee on SO&M
- FHWA program establishment
- ITE-led National Coalition
- Strong Support in prospective Reauthorization
- Current Research

BEYOND CURRENT OPERATIONS BEST PRACTICE

1. **PROACTIVE –** predicting/mitigating potential service disruptions
2. **AGGRESSIVE** applications to gain control over behavior/operations
3. **SYNERGISTIC –** incorporate supply-side &demand-side strategies
4. **AUTOMATED** for rapid response and control
5. **RESPONSIVE –** by manipulating existing capacity
6. **INTERJURISDICTIONAL --** to provide seamless service
7. **PARTNERED --** private cooperation for real time service provision
8. **REGIONAL** on an areawide multimodal basis
9. **INTEGRATED** across vehicle and infrastructure functionalities
10. **COMMUNICATED --** directly to the customers (users)

IMPORTANT FOOTNOTES:

1. This is not a money issue (few states spending more that $50m/year)
2. Visible performance payoff period is short
3. The trade-offs with other options are powerful
4. The customer credibility potential is huge – compared to the options ("we can show visible results now")

BUT, TODAY IN MOST STATES:

- Policy commitment unclear
- Systems Operations not a Core Program
- Responsibility fragmented among divisions, offices
- Limited central accountability for performance
- Informal relationship with other players (PSAs)
- Unclear budgetary & staffing priority
- Minimal relationship with private vehicle & service providers

SELF-ASSESSMENT OF "MAINSTREAMING"

EXAMPLE INDICATOR	"ACTIVITIES" STAGE	"PROGRAM" STAGE
1. **Authorizing Environment**	Minimal policy and stakeholder interest	Legislative support evidenced in funding or reporting requirements
2. **Policy on systems operations & management**	No specific reference in agency policy or strategic plan	Operations and management explicit as agency responsibility
3. **Operations activities as a program**	Basic deployment, but not considered a "core program"	Operations and management as consolidated program
4. **Performance information**	Level of service information is not regularly collected	Performance data is collected and utilized
5. **Organizational alignment**	Operations at 3rd or managed as projects	Operations under single management at 2nd level
6. **Program regional consistency**	Districts pursue individual approaches	Statewide policy on operations and management
7. **Resource allocation to operations & management**	Operations and management activities not separately budgeted	Operations and Management as Identifiable line item(s)
8. **Stakeholder operational cooperation**	Jurisdictions meet and share information	Shared concepts of operations, collocation
9. **ITS in STIP and TIP**	No identifiable Operations and management in plans	Operations and management an visible in capital program

KEY PRECONDITONS

1. Statewide mission priority on Customer-focused performance (Measured)
2. A formal systems management "program" with responsibility/authority
3. Commensurate budget and staff capacity to use it
4. Creation of information infrastructure
5. Formal interjurisdictional arrangements
6. A clear plan to move forward

VDOT is on its Way!!

CLOSING: ESTABLISHING AN OPERATIONS CULTURE?

- 20th Century
  - Public works (output)
  - Project-focused
  - Our jurisdiction
  - 8-5
  - Reactive
  - Business as usual
  - Do it our way
- 21st Century
  - Mobility (outcomes)
  - Customer-oriented
  - The entire system
  - 24X7
  - Proactive
  - Performance-driven
  - Partnerships